Space Weather Forecast

Issued on Tuesday, 27 September 2022 at 13:31 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Likely G1/Minor, chance of G2/Moderate, slight chance of G3/Strong geomagnetic storms Day 1 (27 Sep), perhaps early Day 2 (28 Sept), and then late day 4 (30 Sept). Chance of R1/Minor Radio Blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low with several common-class flares observed, mostly from AR3107. This is one of six active regions on the disc, and is also close to AR3105 in the southern central disc. No growth has occurred in either region, although both are fairly complex. The largest region, in terms of area, is currently AR3110 in the northeast quadrant but this has a simpler magnetic layout. There are also three further small and simple regions on the disc. No Earth-directed coronal mass ejections have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Solar wind parameters have indicated a recent combination of high speed stream and coronal mass ejection arrivals. The solar wind speed has risen to elevated. The total Interplanetary magnetic field strength became briefly Very Strong, then declined back to Strong. The north-south component followed a similar trend but stayed mostly positive during much of the Strong and Very Strong periods. Geomagnetic activity was Quiet to Active (Kp 0-4), with two G1/Minor storm periods during the first two periods of 27th September UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) was raised above normal background levels, with a recent upward trend, but has remained well below the level of a solar radiation storm.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be generally Low, with a chance of isolated Moderate-class flares.

Solar Wind / Geomagnetic Activity: Solar wind speeds are currently elevated and expected to be slightly elevated to elevated through much of the period before the high speed stream from coronal hole 27 arrives late day 4 (30th) or perhaps day 5 (1st Oct). Last rotation this CH gave strong solar wind speeds, and a brief G3/Strong storm interval near the onset. A similar forecast this rotation is not unreasonable.

Geomagnetic activity is therefore likely to be Unsettled to Active with likely G1/Minor storm intervals, a chance of G2/Moderate storms and a slight chance of G3/Strong storms day 1 (27th), perhaps lasting until early day 2 (28th), before becoming Quiet to Unsettled from late day 2 (28th). A further similar increase is expected from late day 4 (30th) onward.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to persist close to background levels, with a slight chance of rising towards the radiation storm (S1) level if any notable flares occur, most likely from the larger regions near south centre disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	60	50	20	60
Strong	G3	No	10	5	1	10
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	30	30	30	30
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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